526mLINK
Communication software for GR-526C console

Users Manual
January 14, 2002
Rev 1.0
Software version 1.00 or later

EXPLORANIUM
RADIATION DETECTION SYSTEMS

526mLINK USERS MANUAL

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1.0   GENERAL

526mLINK performs data transfer between the GR-526C console and a computer. The connection between the GR-526C console and the computer is via a modem. **526mLINK** allows the user to do the following operations:
-    real-time monitoring of **GR-526C** status with automatic download of the current alarm;
-    download, view, and print **GR-526C** History file;
-    download, view, and print **GR-526C** Alarm file;
-    download, view, print, and change **GR-526C** Parameters settings;

526mLINK is the ideal tool for: periodic inspection, data archiving, diagnostic and service.
During mLINK session, the GR-526C console does not interrupt normal monitoring except when GR-526C parameters are changed. In this case, monitoring is interrupted until the connection is closed, when the console restarts monitoring using the new settings.

1.1   SYSTEM REQUIREMENTS

Minimum requirements for the computer running **mLINK** are:
-    Windows 95/98/NT/2000 operating system
-    Pentium 166 MHz processor
-    32 MB RAM
-    200 MB free hard drive space
-    modem (internal or external) connected on one of the standard COM ports: COM1-COM4

526mLINK requires that the software running in **GR-526C** console is **2.16.T** or later.

1.2   SOFTWARE INSTALLATION

To install **526mLINK** proceed as follows:
-    insert **526mLINK Installation disk** into the drive;
-    on the Windows desktop click on **Start** button and then select **Run;**
-    in the **Run** dialog click on **Browse**, select **Setup.exe,** and click on **Open;**
-    in the **Run** dialog click on **OK,** installation screen opens;
-    follow the instructions on the screen until installation is completed;
-    answer NO if asked: **do you want to restart your computer ?**
-    setup **ODBC** driver – only for the first time installation:
    1.   Open **Control Panel** and open **ODBC Data Source Administrator;**
    2.   Chose **Add**…;
    3.   Select **Microsoft Access Driver (*.mdb);**
    4.   Press **Finish;** next **ODBC Microsoft Access Setup** form will open;
    5.   In **ODBC Microsoft Access Setup** form specify **Data Source Name** as **GR526;**
    6.   Press **Select** and select **GR526.mdb** file found in **526mLINK** installation folder;
    7.   Press **OK;**
-    restart the computer;
-    create a shortcut for the newly installed program;

1.3   HARDWARE SETUP

Before running **526mLINK** it is necessary to establish a physical connection between the **GR-526C** console and the PC running **526mLINK. GR-526C** console is supplied with a telephone modem. This modem has to be connected to a telephone line. If there is no access to a telephone line then the modem is replaced by a cell phone modem. In both situations it is important to note the telephone number corresponding to modem connected to **GR-526C** console. The PC needs a modem as well. This modem -external or internal – should be connected to telephone line allowing it to call **GR-526C** phone number.

It is recommended to have dedicated phone lines for every **GR-526C** as well for the **PC** running **526mLINK** program.

2.0   526mLINK BASIC OPERATION – A BRIEF TOUR

To start **526mLINK** program, double-click on its shortcut on the desktop, or double-click on **526mLINK.EXE** in installation folder. After start-up, **526mLINK** displays a list of available GR-526 consoles. The user has to select the system he wants to inspect.

526mLINK has two modes of operation: **on-line** and **off-line**.

On-line operation: 526mLINK dials the selected **GR-526C** console to negotiate a modem connection. Once the connection is established, **526mLINK** downloads parameters file, history file and the last alarm. All these data are updated in the **GR526 MS-Access** database. This database is automatically created at the installation time. Next **526mLINK** goes to **Monitoring** mode, displaying a window shown in **Fig. 1**:
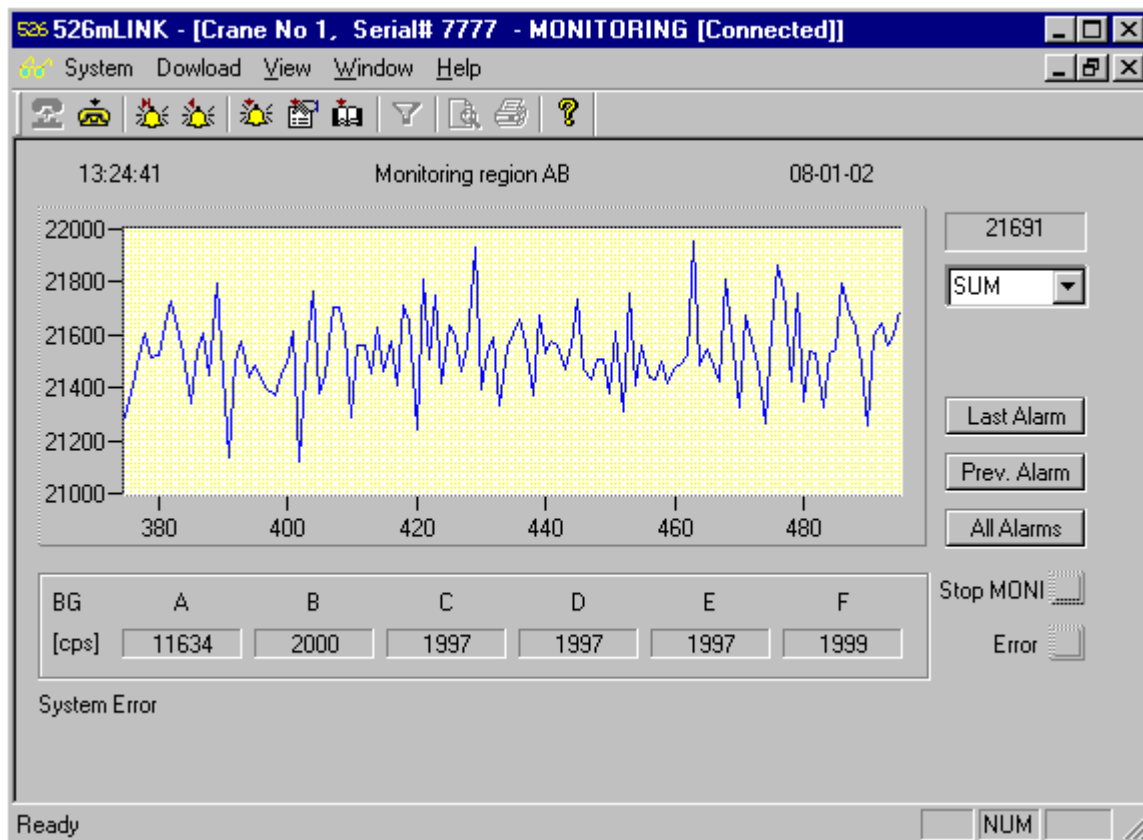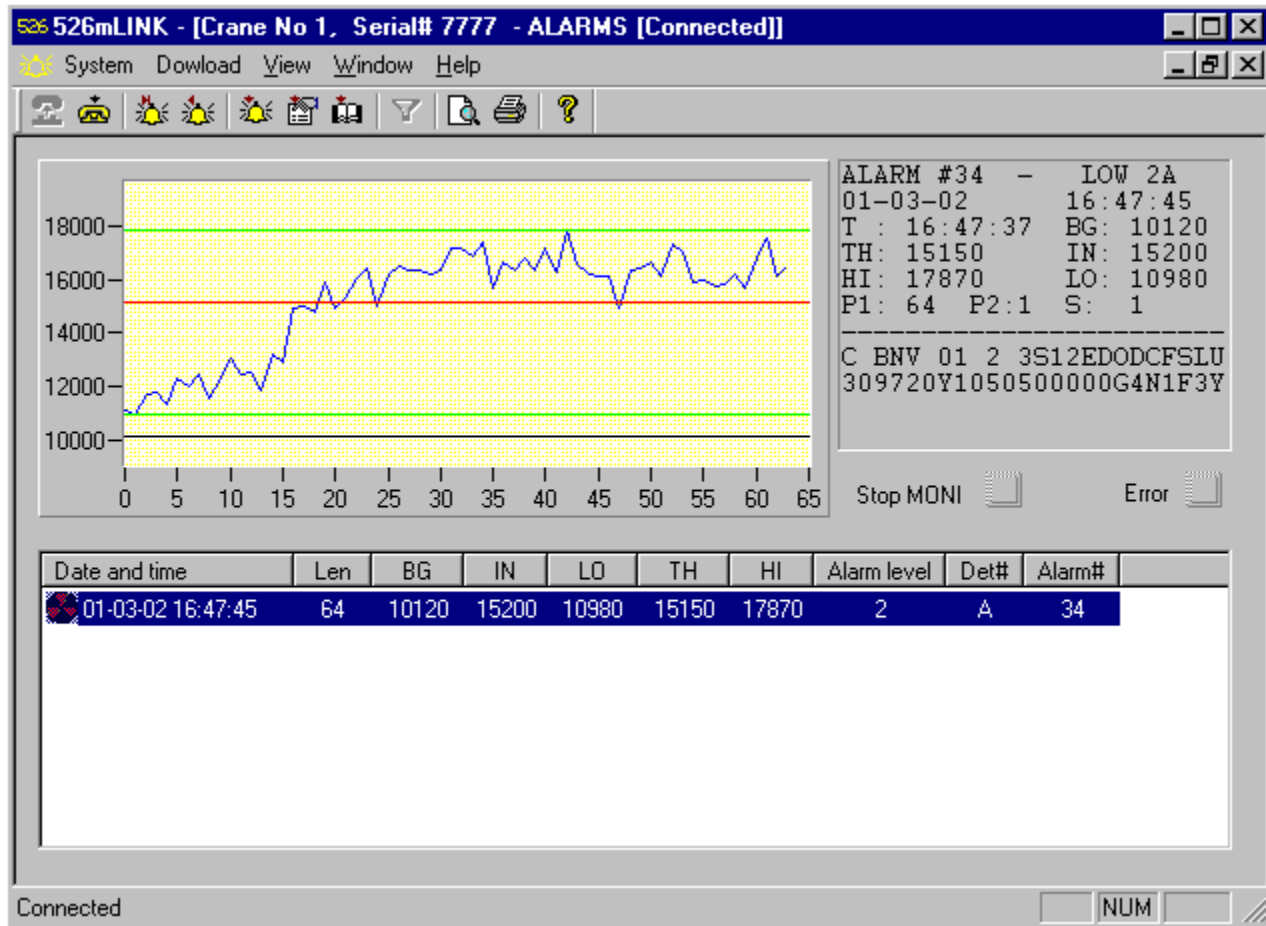

Figure 1

Monitoring window replicate the same information displayed on **GR-526C** console screen:
- **time and date** - are **GR-526C** time and date independent of the time/date settings on the **PC;**
- **System Ready/Monitoring region AB (CD, EF, ab) –** identical with the **GR-526C** display;
- **BG[cps] –** background radiation in counts per second for each individual detector;
- **21691**   **-** sum of all detectors in counts per second – the user can select to see only the counts from an individual detector;
- **System Error –** displays the same error message appearing on **GR-526C** screen- if no error the display is blank;
- **Last Alarm** – initiates downloading of the most recent alarm stored in the **GR-526C** alarm file;
- **Prev. Alarm** – initiates downloading of the alarm previous to the last downloaded alarm;
- **All Alarms** – initiates downloading of the entire **GR-526C** alarm file;

Monitoring window is refreshed every 1-2 seconds. While **526mLINK** continues to refresh **Monitoring** window, the user can view and print history, alarm and parameters files. If during **mLINK** session an alarm is generated by **GR-526C** console, the alarm will be automatically transferred to **mLINK** and shown to the user as in **Fig. 2**.

Figure 2

GR526C console operation is not affected in any way by the connection with **526mLINK** modem. However, if the user makes a parameter change, **GR526C** console interrupts monitoring until the end of **mLINK** session. **StopMONI** indicator will alert **mLINK** user that **GR526C** scrap monitoring is suspended therefore he should try to minimize this time. **GR526C** console has 3 minutes built-in timeout. **GR526C** console will automatically resume monitoring, if during 3 minutes there is no activity from **mLINK** user. This is a protection against the possibility that **mLINK** user suspends monitoring and then forgets to close **mLINK** session.

During **mLINK** session the user can inspect all photomultipliers (PMT) in the system using **Discriminators Screen** window. This window allows changing the mode of operation and discriminator level for each individual PMT. **Discriminators Screen** is a valuable diagnostic and troubleshooting tool for the detector hardware.


Off-line operation: All the information downloaded during **on-line** operation and previous **mLINK** sessions are automatically stored in **GR526** database. During **off-line** operation the user can view history, alarms and parameters stored in database. First select the **GR-526C** system, then specify the time interval of interest and finally view history, alarms and parameters.

Using **MS-Access** it is possible to generate periodically reports about alarms, system errors or other events recorded in the database. In order to maintain the database in sync with the **GR-526** console is necessary to call all the systems periodically, to ensure that database is updated constantly and no data are lost

3.0   GR-526C mLINK - DETAILED OPERATION

3.1   Connecting to GR-526C console.
To start **526mLINK**, double click on its shortcut on the desktop, or double-click on **526mLINK.EXE** in installation folder. After start-up, **mLINK** presents to the user a window as shown in **Fig 3**.
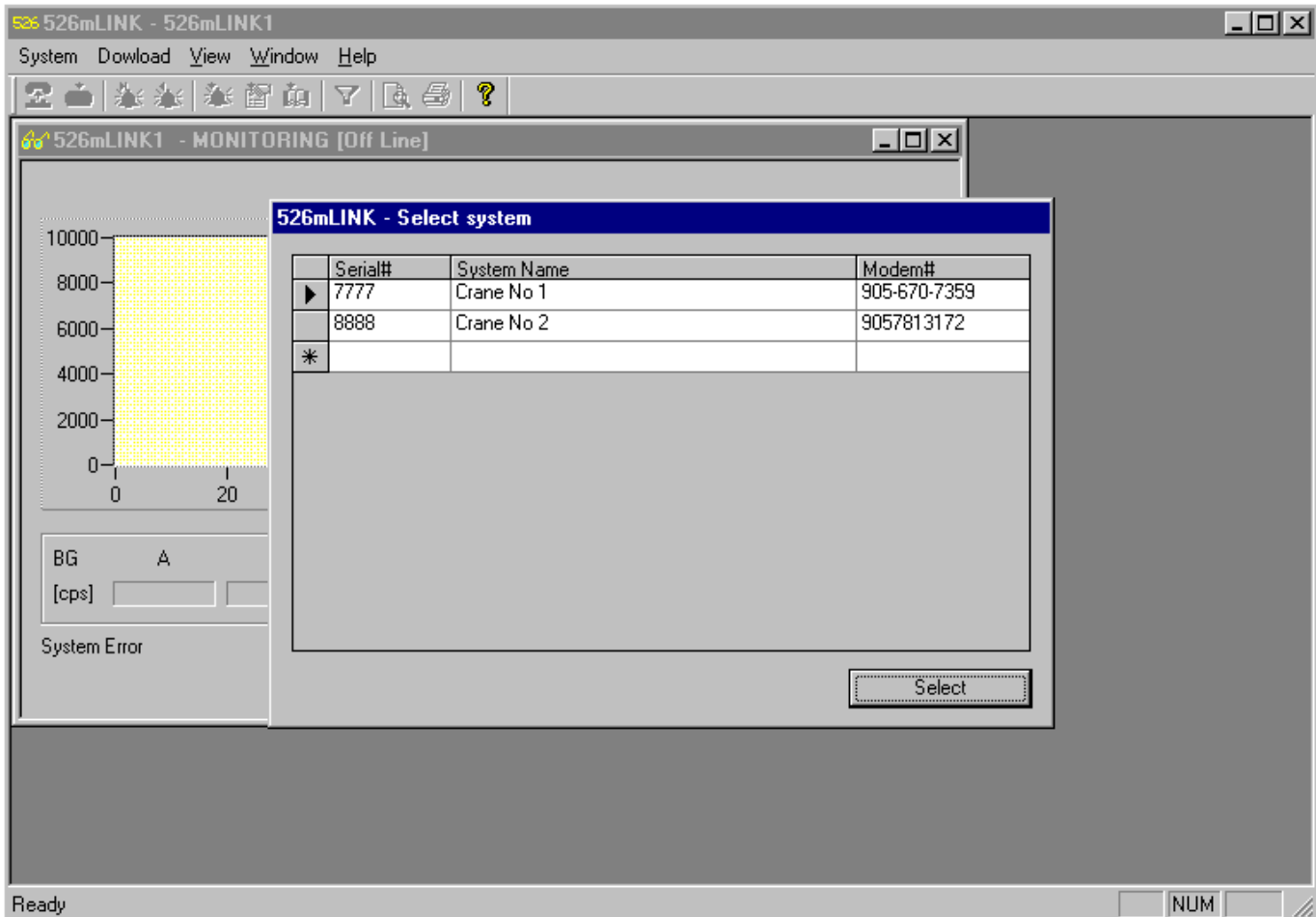
Figure 3

Select system window is automatically opened every time the program is started. This window allows the following operations:

1. **to select a GR-526 system from the list:** click on any cell of the row and then click on **Select** button;
2. **to add a new record to the list:** select the row marked with ' * '; click on the field to be updated and input the new value for that field; repeat this operation for all the fields. When all the fields in a row have been updated, click on the row above it to create a new empty row marked ' * ';
3. **to delete a record from the list:** select the entire row by clicking on the first cell of the row; when the row is selected press **Delete** key.

When **526mLINK** is running for the first time after installation, **Select system** window displays some default values not valid for a specific user. The user should add new record(s) for each **GR-526C** console to be monitored. A record consists of the following fields:

- **Serial#:** enter the serial number displayed by **GR-526C** console at initialization. The console prints the

serial number together with System Parameters. To obtain a printout for System Parameters enter the following key combination: **<ENTER> 9999 <ENTER>** at **GR-526C** console.

- **System Name**: use this field to create a name for each **GR-526C** system. **System Name** should be more convenient to work with and can be in local language.

- **Modem#:** enter the telephone number of the modem connected to **GR-526C** console.

When all the fields are completed, click on the row above it to force an update with the new record.
An empty row marked with ' * ' is created. This row is used to input data for a new **GR-526C** console.
When all console have been recorded, the first 2 rows with default values may be deleted.
To select one **GR-526C** system and click on the corresponding row and then click on **Select** button to close the window.

When **526mLINK** is running for the first time after installation, it is necessary to setup the COM port and modem initialization prior to dialing GR-526 console. Menu **System | COM port and modem setup** opens a setup window shown in **Fig. 4**.
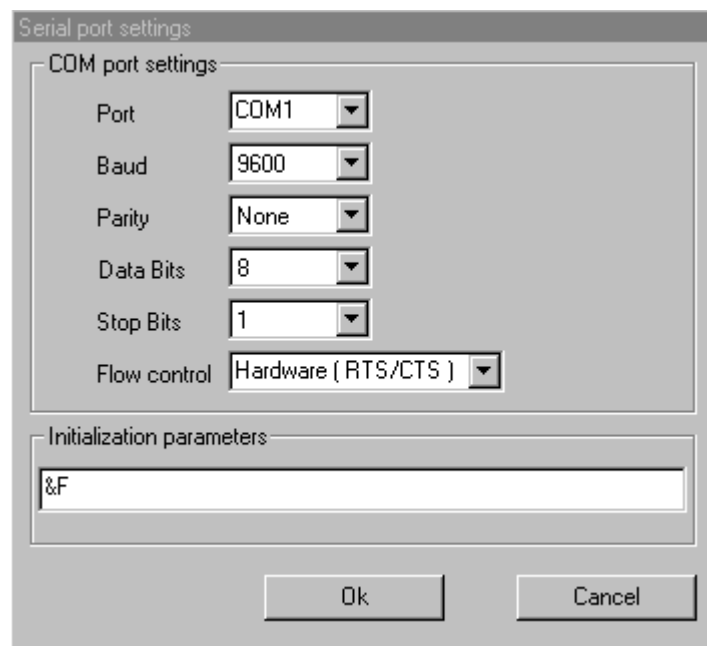
Figure 4

Select the COM port connected to modem. The rest of the COM port settings should be left unchanged for the vast majority of modems. Only in special cases these fields need to be changed from default settings. The **Initialization parameters** field specifies the initialization string for the modem. The recommended value is **&F** unless otherwise specified in the modem manual. When all the settings are done, click on **OK** button to close the window. All the settings are stored in **GR526** database, under the system, which is currently selected. This operation must be repeated for each **GR-526C** system in the list (**Fig. 3**).

To connect to the selected **GR-526C** system, go to menu **System | Call** or click on the button 📞
The modem connected to the **PC**, dials **GR-526C** modem and both modems will start negotiating the connection parameters. After connection has been established, **CONNECTED** is displayed in the windows title bar, and **mLINK** starts downloading parameters file, history file and the last alarm.

These files are saved in **GR526** database. During system files download, a dialog windows display the progress of the operation. At this point **mLINK** and the **GR-526C** console are ready for a remote session.

A **mLINK** session is maintained until the **mLINK** user ends it by selecting menu **Sytem | Hung up** or by clicking on 📞 button.

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3.2   Downloading data from the GR-526C

In the **System Menu,** click on **Download,** and a pull-down menu is open with the following menu items:

> **Download parameters file**
> **Download history file**
> **Download alarm file**
> **Download all files**
> ------------------------
> **Download last alarm**
> **Download previous alarm**
> **Download next alarm**

Download parameters file - downloads **GR-526C** parameters file. This operation is executed automatically by **mLINK** immediately after the connection with the **GR-526C** console. The user needs this menu in case of an error during automatic download or to refresh the information to the latest **GR-526C** status.

The speed button ![icon] has the same effect as the menu **Download parameters file**.

Download history file - downloads the **GR-526C** history file. History file records important events: alarms, speed infractions, system errors, resets, and changes in the system setup. **GR-526C** updates this file at all times. History is automatically downloaded at the beginning of the session. The provision of a separate menu item for the history file allows the user to get the newest version of history file without the need to download the whole system files group. Every time history file is downloaded, all records contained in it are inserted into MS-Access database for update. A history record consists of 3 fields: date, time and event label. Database is updated only if at least one of the fields is different from the ones already recorded in the database. If **GR-526C** history file is downloaded periodically – every 2-3 days – then after 6 month the database will contain an uninterrupted history file covering 6 month time.

The speed button ![icon] has the same effect as the menu **Download history file**.

Download alarm file - downloads **GR-526C** alarm file. This file is the largest of all **GR-526C** files, therefore it requires about 1-2 minutes to download. After the connection has been established the last alarm is downloaded automatically. It is recommended to download the entire alarm file once per **526mLINK** session to ensure that database is updated and no alarm record is lost.

The speed button ![icon] has the same effect as the menu **Download alarm file.**

Download all files – this menu downloads all **GR-526C** files: parameter file, history file and alarm file. This transfer requires about 2-3 minutes to complete. This menu is useful for updating the database periodically without inspecting the status of **GR-526C**.

Download last alarm – this menu allows the user to transfer the last alarm from **GR-526C** alarm file. At the end of the transfer, Alarm View window is opened and the last alarm is presented to the user for inspection. If the alarm was not stored in the database it will be automatically inserted.

The speed button ![button] has the same effect as the menu **Download last alarm**.

Download previous alarm – this menu allows the user to transfer the alarm previous to the last downloaded alarm. At the end of the transfer, the Alarm View window is opened and the downloaded alarm is presented to the user for inspection. If the alarm was not stored in the database it will be automatically inserted. Together with **Download next alarm**, these two menu items allow the user to navigate through **GR-526C** alarm file one alarm at a time.

Download next alarm – this menu allows the user to transfer the alarm next to the last downloaded alarm. At the end of the transfer, the Alarm View window is opened and the downloaded alarm is presented to the user for inspection. If the alarm was not stored in the database it will be automatically inserted.

The speed button ![button] has the same effect as the menu **Download next alarm**.

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3.3   Viewing GR-526C data

Using this menu allows viewing of all **GR-526C** files downloaded with **Download** menu. The **View** pull-down menu offers the following choices:
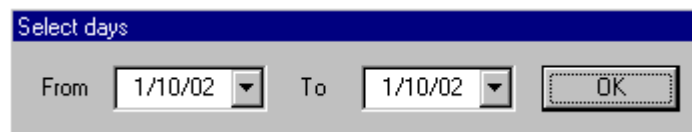
> **View alarms**
> **View history**
> **View parameters**
> **View discriminators screen**

View alarms - opens a window for viewing the alarm file. In case of off-line operation a dialog window **Select Days** (**Fig. 5**) allows the user to choose the time period of interest.

Figure 5

Next the alarm view window is displayed (**Fig. 6**). It has two sections: the upper part displays the alarm profile and alarm data. The lower part displays a list of all alarms found in database within the specified time period. The list is initially ordered by date and time column, and it will be re-ordered by any of the column when the corresponding column's heading is clicked on. To select an alarm to view, click on the corresponding row in the list. The alarm graph has Y- axis in counts per second and X-axis in number of samples. Also the alarm graph shows some important values as horizontal colored lines: **black** – background level, **red**- alarm threshold, **green** – minimum and maximum values. On the right side of the alarm graph, alarm data is displayed in the same format as normal **GR-526** alarm printout.

To print the alarms go to menu **System | Print**, click on the print button ![print] or pres **Ctlr+P**.

It is recommended to organize the printout, using **Print Preview.** Go to **System | Print Preview** or click on the speed button ![preview] .
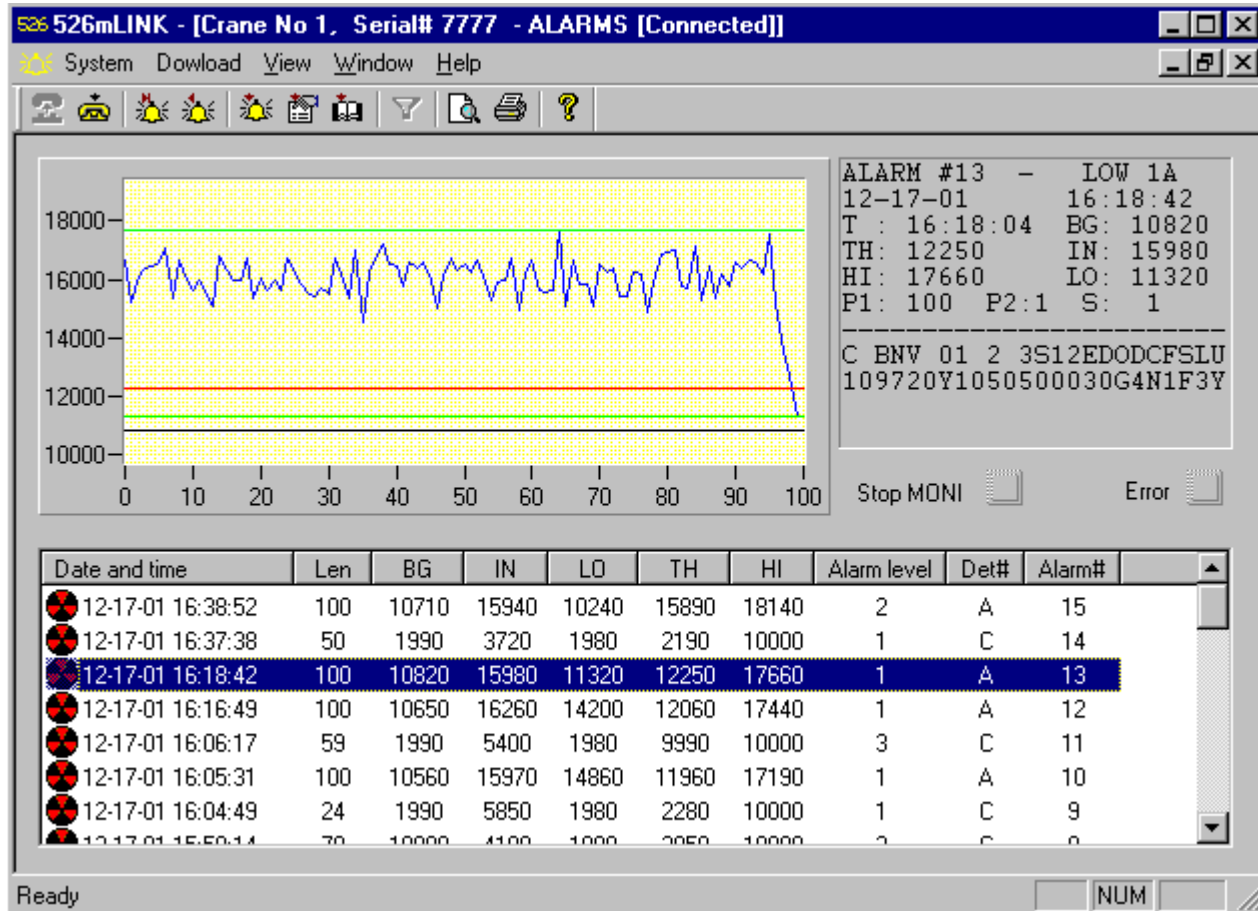
Figure 6

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View history - opens a window for viewing the history file. In case of off-line operation the dialog window **Select Days** (**Fig. 5**) allows the user to choose the time period of interest.
Next the history view window is displayed (**Fig. 7**).

Figure 7

History file is initially ordered by date and time column, and it will be re-ordered by any of the column when the corresponding column's heading is clicked on.

To print the history go to menu **System | Print**, click on the print button 🖨 or pres **Ctlr+P**.

For Print Preview, go to **System | Print Preview** or click on the speed button [icon].

View parameters - opens a window for viewing/changing **GR-526C** parameters. In case of off-line operation the dialog window **Select Days** displays the days when the **GR-526C** parameters have been changed and the change was recorded in the database. Next the parameters window is displayed (**Fig. 8**).
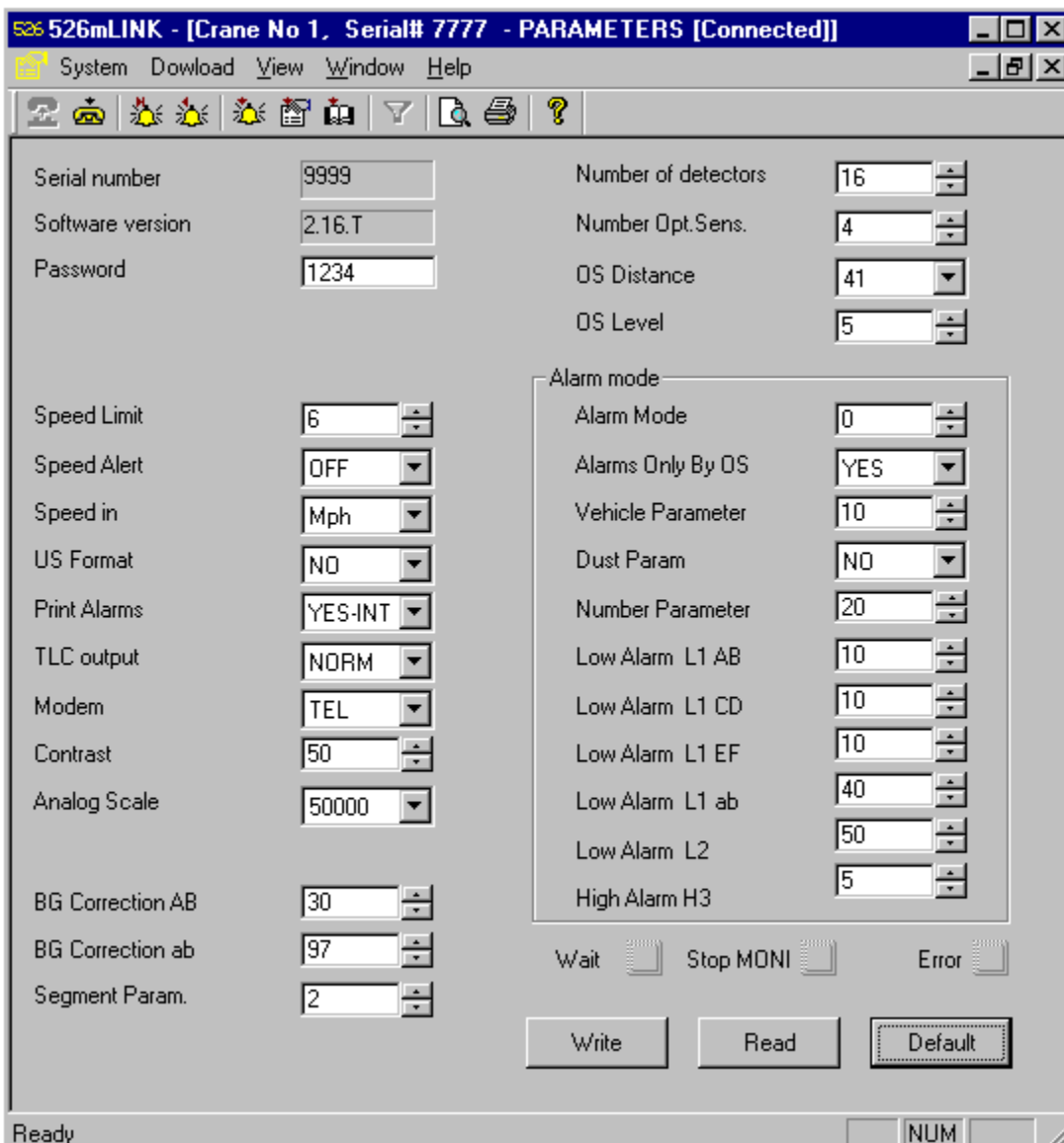
To print **GR-526C** parameters go to menu **System | Print**, click on the print button [icon] or pres **Ctlr+P**.

For Print Preview, go to **System | Print Preview** or click on the speed button [icon].

View discriminator screen - opens a window for viewing/changing **GR-526C** discriminators.
This window (**Fig.9**) is not accessible off-line.

3.4   Changing GR-526C settings

Changes to **GR-526C** settings are possible only **on-line**. An active modem connection is needed before any changes are allowed. To change GR-526C parameters: select menu **View | View parameters** and

Figure 8

mLINK opens a window as shown in **Fig. 8**. For the explanation of the meaning and functionally of **GR-526** parameters consult **GR-526 User Manual**.

Parameter window has 3 indicators:
- **Wait -** this indicator is on when **mLINK** waits for GR-526C to respond to a request;
- **StopMONI –** indicates that, as a result of a parameter change, **GR-526C** has interrupted monitoring;
- **Error –** this indicator signals a transfer error in the communication between **mLINK** and **GR-526C;**

There are also 3 buttons controlling the following operations:
- **Write - mLINK** sends new parameter settings to **GR-526C** console; **GR-526C** interrupts monitoring, changes the parameters to the new values received from **mLINK,** and displays **REMOTE SETUP** on its screen;
- **Read – mLINK** reads parameter settings from **GR-526C** console; **GR-526C** sends its current parameters to **mLINK**;
- **Default - mLINK** forces **GR-526C** console to load default parameters; **GR-526C** interrupts monitoring, changes the parameters to the default values and displays **REMOTE SETUP** on its screen; **mLINK** reads parameter settings from **GR-526C** console and displays them in **Parameters** window.

Every time parameters are read from **GR-526C,** they are compared with the last parameters record in the database. If they are found different then the new parameters are stored as new record in the database. In this way the database keeps a record of all the changes of parameters for each GR-526 console.

All the parameters changes are also recorded in **GR-526C** history file, independent of the **GR-526** database**.**

IMPORTANT NOTE: Due to the complexity of the GR-526C algorithms it is strongly recommended that all parameters changes should be done only after consultation with an EXPLORANIUM specialist.
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Changing GR-526C discriminators: **View | View discriminator screen** menu opens the **Discriminators** window (**Fig. 9**). This window allows to view and change discriminators and mode for each individual PMT. For more details about these parameters and their meaning, consult **GR-526 User Manual**.

The window has 3 indicators:
- **Wait -** this indicator is on when **mLINK** waits for **GR-526C** to answer a request
- **StopMONI –** indicates that, as a result of a parameter change, **GR-526C** has interrupted monitoring
- **Error –** this indicator signals a transfer error in the communication between **mLINK** and **GR-526C**

There are 3 buttons controlling the following operations:
- **Read – mLINK** reads discriminators settings from **GR-526C** console; **GR-526C** sends its current discriminators to **mLINK**;
- **Default - mLINK** forces **GR-526C** console to load default discriminator values; **GR-526C** interrupts monitoring, changes the discriminators to the default values and displays **REMOTE SETUP** on its screen; **mLINK** reads parameter settings from **GR-526C** console and displays them in **Discriminator** window.
- **Close –** closes window;

Update button is initially invisible. m**LINK** makes **Update** button visible after the user changed any discriminator value. **Update** button signals that **mLINK** displayed values are not longer identical with the actual **GR-526C** discriminators.
- **Update - mLINK** sends new discriminator settings to **GR-526C** console; **GR-526C** interrupts monitoring, changes the discriminators to the new values received from **mLINK,** and displays

REMOTE SETUP on its screen;
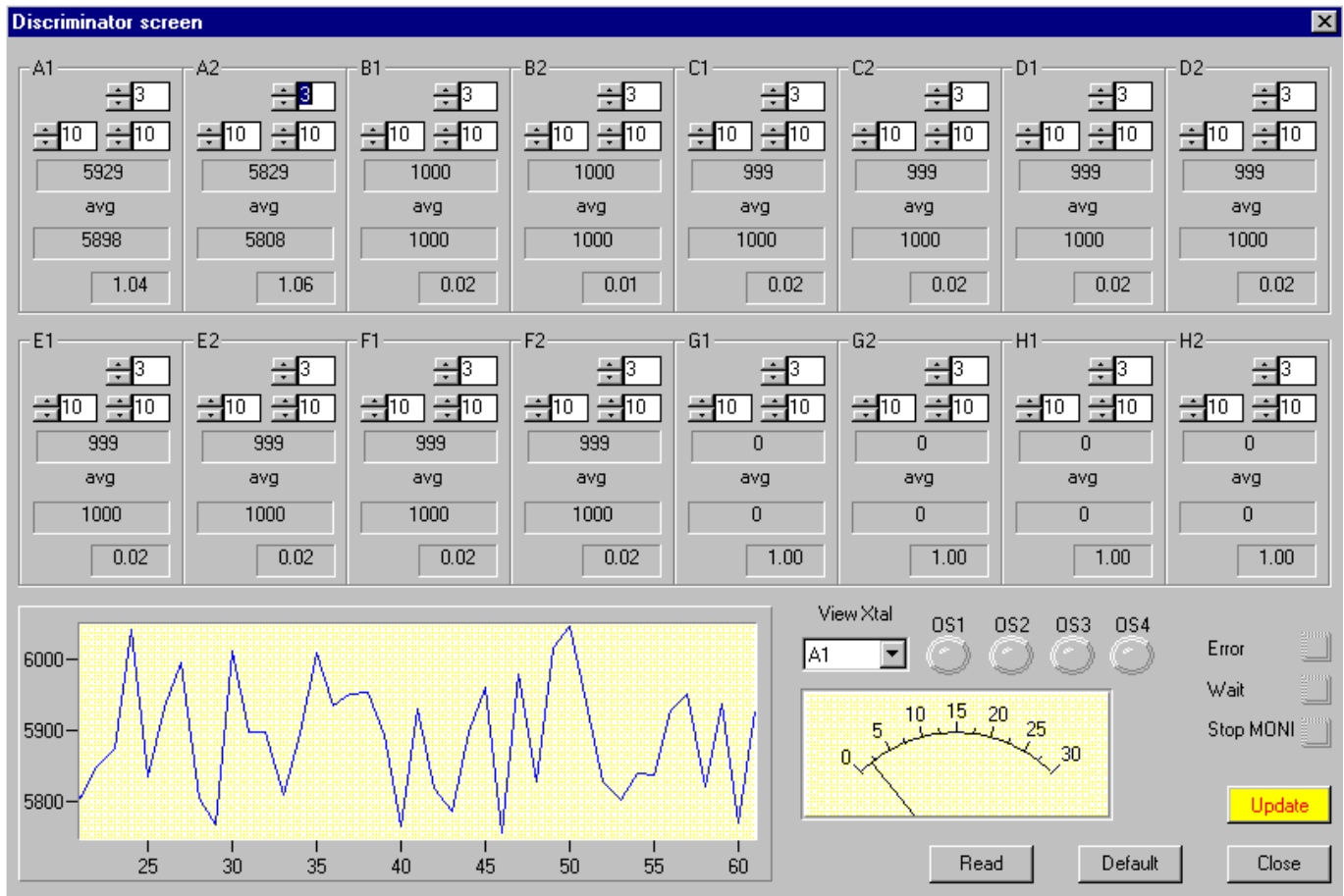
Figure 9

There are 16 identical indicators labeled A1, A2, B1, B2,..H1, H2. Each one of these indicators displays data from the corresponding crystal.

While the **Discriminator** window is open, **GR-526C** sends the count rate in counts per second for all 16 crystals. These values are displayed together with discriminator level and PMT mode (1= left, 2- right, 3- coincidence). A 30 second average labeled "**avg**" is computed and displayed for all 16 crystals.

The ratio between theoretical standard deviation and experimental standard deviation [**S/Er**] is computed and displayed every 30 second. **S/Er** is a good indication for the PMT noise level and should normally be between 0.5 and 1.5.

To modify a discriminator, click on UP/DOWN arrow to increase/decrease the value. **mLINK** detects any change and makes **Update** button visible as shown in **Fig. 9**. When all changes are done, by clicking on **Update** button, new values are sent to **GR-526C** console. After the new values are sent, **mLINK** makes **Update** button invisible. This button will become visible again if **mLINK** detects a new change.

GR-526C receives new discriminators and mode, suspends monitoring, and displays **REMOTE SETUP** instead of **SYSTEM READY**. While monitoring is suspended, **StopMONI** indicator is turned on and remains on until the end of session. The current settings can be read at any time by clicking on **Read** button.

To set all discriminators and mode to their default values, click on **Default** button. This will cause the **GR-526C** to suspend monitoring, set default values for all crystals, and send these values back to **mLINK**. In

this turn, **mLINK** receives and displays default values, and sets **StopMONI** indicator.
In the lower left corner of the window, a chart displays the count rate information for a particular crystal. To select another crystal, click on UP/DOWN arrows of **View Xtal** control.

OS1, OS2, OS3, OS4 indicators show real time status of the optical sensors.

To close **Discriminator screen** window, click on the **Close** button. Changes not sent to the **GR-526C** using **Update** button are discarded.